FULNOOR CHEEMA
STUDENT, BIOLOGICAL AND ENVIRONMENTAL SCIENCES

DETERMINING THE EFFECTS OF ANTIMICROBIAL PEPTIDE HUMAN BETA-DEFENSIN 2 ON STAPHYLOCOCCUS EPIDERMIDIS BIOFILM INHIBITION

Bacterial resistance to antibiotics poses a challenge to the effective treatment of infectious diseases. Bacterial biofilms play a significant role in bacterial resistance to antibiotics. In order to combat resistance, the use of the antimicrobial peptide Human Beta Defensin 2 (HBD2) has been studied as a possible co-therapy with antibiotics. Staphylococcus epidermidis biofilm forming capacity plays a large role in its pathogenesis and antibiotic resistance. The purpose of this experiment was to determine if HBD2 would inhibit S. epidermidis biofilm formation. A biofilm formation assay was conducted by growing S. epidermidis biofilms in 96-well microtiter plates. Once this was achieved, biofilm inhibition assays were conducted by administering treatments to S. epidermidis of HBD2 at different concentrations, specifically 1uM and 0.5uM. The biofilm growth of treated wells was compared to growth of positive controls, which contained no defensin, and negative controls, which contained only media. Cell counts were conducted to determine the viability of cells. This was done to determine whether biofilm growth was being inhibited or if planktonic cells were being killed. The findings showed no significant difference between biofilm growth of the positive control and the 0.5uM treated wells. There was also no significant difference in biofilm growth between the positive control and the 1uM treated biofilms but also no significant difference between the 1uM treated biofilms and the negative control. The 1uM treated biofilms were inhibited enough that there was no significant difference between the negative control, however they were still prominent enough to show no significant difference between the positive control. There was no significant difference between cell counts for cells treated with HBD2 and control cells. In conclusion, it is possible HBD2 could inhibit S. epidermidis biofilm growth at higher concentrations, but further research is necessary.

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